

965 **Claims**

What is claimed is:

1. A method for the detection and analysis of patterns comprises the steps of:

- a) Input an image containing object labels;
- b) Perform relational feature development using the input image to create at least one pattern map output;
- c) Perform relational feature analysis using the at least one pattern map to create a relational feature analysis result output.

970 2. The pattern detection and analysis method of claim 1 further comprises a recipe for automation control.

3. The pattern detection and analysis method of claim 1 further includes determination of a genetic anomaly.

980 4. The pattern detection and analysis method of claim 1 wherein the relational feature analysis method selects from the set consisting of:

- a) PatternMap viewing,
- b) PatternMap operation.

985 5. The pattern detection and analysis method of claim 1 wherein the relational feature development method further comprises the steps of:

- a) Perform core measurement table development using the input image to create at least one core measurement table output;
- b) Perform feature table production using the at least one core measurement table to create at least one feature table output;
- c) Perform PatternMap creation using the at least one feature table to create a PatternMap output.

995 6. The relational feature development method of claim 5 further comprises a PatternMap integration and update step to create an updated PatternMap.

7. The relational feature development method of claim 5 wherein the core measurement table selects from the set consisting of:

1000        a) Conditional table,  
              b) Relational table.

8. The core measurement table of claim 7 wherein the conditional table includes measurements from the set consisting of:

1005        a) Boundary distance,  
              b) Radial distance.

9. The core measurement table of claim 7 wherein the relational table includes measurements from the set consisting of:

1010        a) Object distance,  
              b) Radial difference,  
              c)  $\Delta$ boundary difference,  
              d) Pixel distance.

1015 10. The conditional table measurement of claim 8 wherein the boundary distance measurement further comprises the steps of:

1020        a) Perform structure object mask production using the input image to create a structure object mask output;  
              b) Perform inner distance transform using the structure object mask to create an inner distance transform image output;  
              c) Find individual object centroids using the input image to create individual object centroids output;  
              d) Find object boundary distance using the individual object centroid and the inner distance transform image to create an object boundary distance output.

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11. The relational table measurement of claim 9 wherein the object distance measurement further comprises the steps of:

a) Perform adaptive zone of influence using the input image to create a ZOI boundary output;

1030 b) Populate the object distance table using the ZOI boundary output to create an object distance table output.

12. The relational table measurement of claim 9 wherein the pixel distance measurement includes measurements from the set consisting of:

1035 a) Pixel distance average,  
b) Pixel distance edge.

13. The relational feature development method of claim 5 wherein the feature table production further consists of the following steps:

1040 a) Select one input relational table;  
b) Select a feature rule;  
c) Choose a data treatment;  
d) Select a class member integration rule.

1045 14. The feature table production of claim 13 wherein the feature rule selects from the set consisting of:

a) Element based rules,  
b) Row based rules.

1050 15. The feature rule of claim 14 wherein the element based rules selects from the set consisting of:

a) Conditional CM table rules,  
b) Relational CM table rules.

1055 16. The relational feature development method of claim 5 wherein the PatternMap integration and update step selects from the set consisting of:

- PatternMap integration rule,
- PatternMap update rule.

1060 17. The relational feature analysis method of claim 4 wherein the PatternMap Viewing selects from the set consisting of:

- Color coded map,
- Bar chart,
- Histogram,
- Image montage.

1065 18. The pattern detection and analysis method of claim 2 wherein the recipe for automation control is selected from the set consisting of:

- Image loading recipe,
- Feature table production recipe,
- PatternMap creation recipe,
- PatternMap update and integration recipe,
- PatternMap operations recipe,
- Output recipe.

1070 19. A relational feature development method comprises the steps of:

- Input an image containing object labels;
- Perform core measurement table development using the input image to create at least one core measurement table output;
- Perform feature table production using the at least one core measurement table to create at least one feature table output;
- Perform PatternMap creation using the at least one feature table to create a PatternMap output.

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1085 20. The relational feature development method of claim 19 further comprises a PatternMap integration and update step to create an updated PatternMap.

21. The relational feature development method of claim 19 wherein the core measurement table selects from the set consisting of:

1090 a) Conditional table,  
b) Relational table.

22. The core measurement table of claim 21 wherein the conditional table includes measurements from the set consisting of:

1095 a) Boundary distance,  
b) Radial distance.

23. The core measurement table of claim 21 wherein the relational table includes measurements from the set consisting of:

1100 a) Object distance,  
b) Radial difference,  
c)  $\Delta$ boundary difference,  
d) Pixel distance.

1105 24. The conditional table measurement of claim 22 wherein the boundary distance measurement further comprises the steps of:

a) Perform structure object mask production using the input image to create structure object mask output;  
b) Perform inner distance transform using the structure object mask to create inner distance transform image output;  
c) Find individual object centroid using the input image to create individual object centroid output;  
d) Find object boundary distance using the individual object centroid and the inner distance transform image to create object boundary distance output.

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25. The relational table measurement of claim 23 wherein the object distance measurement further comprises the steps of:

- a) Perform adaptive zone of influence using the input image to create ZOI boundary output;
- 1120 b) Populate the object distance table using the ZOI boundary output to create the object distance table output.

26. The relational table measurement of claim 23 wherein the pixel distance measurement includes measurements from the set consisting of:

- 1125 a) Pixel distance average,
- b) Pixel distance edge.

27. The relational feature development method of claim 19 wherein feature table production further includes the following steps:

- 1130 a) Select one input relational table;
- b) Select a feature rule;
- c) Choose a data treatment;
- d) Select a class member integration rule.

1135 28. The feature table production of claim 27 wherein the feature rule is selected from the set consisting of:

- a) Element based rules,
- b) Row based rules.

1140 29. The feature rule of claim 28 wherein the element based rules are selected from the set consisting of:

- a) Conditional CM table rules,
- b) Relational CM table rules.

1145 30. The relational feature development method of claim 19 wherein the PatternMap integration and update step are selected from the set consisting of:

- a) PatternMap integration rule,
- b) PatternMap update rule.

1150 31. A boundary distance measurement comprises the steps of:

- a) Input an image containing object labels;
- b) Perform structure object mask production using the input image to create structure object mask output;
- c) Perform inner distance transform using the structure object mask to create inner distance transform image output;
- d) Find individual object centroid using the input image to create individual object centroid output;
- e) Find object boundary distance using the individual object centroid and the inner distance transform image to create object boundary distance output.

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